Prediction of persistent knee pain by pressure pain detection thresholds: results from the Knee Pain In the Community cohort (KPIC)

McWilliams DF, Frowd N, Marshall L, Stocks J, Sarmanova A, Fernandes GS, Hall M, Zhang W, Doherty M, Valdes AM, Walsh DA.

Background

Knee pain results from a combination of nociceptive input from the joint, and processing by the central nervous system. Pressure pain detection thresholds (PPTs) are lower and pain is more severe in people with greater central sensitisation.

Objective

We hypothesised that lower PPTs predicted worse pain prognosis in people with knee pain.

Methods

KPIC participants were people aged >40 years recruited from Nottingham, UK. Participants were mailed questionnaires at baseline and 1 year. This study reports a sample of responders who attended baseline and 1 year clinical assessment, had self-reported knee pain (within the last 4 weeks) and underwent PPT. PPTs were measured at the knee, anterior tibia and the sternum. Radiographic knee OA was classified using an atlas. Questionnaires measured ICOAP (constant and intermittent knee pain), painDETECT (neuropathic-like) and average knee pain severity over 4 weeks (0-10).

The presence of pain at baseline and 1 year (persistent pain), or pain severity were predicted from baseline anterior tibia PPT. Additional analyses adjusted for baseline pain score, age, sex, BMI, or for radiographic knee OA. Pain persistence (Yes/No) was analysed using t tests, odds ratios (OR) and logistic regression. Pain severity was analysed using linear regression.

Results

The sample for this study contained n=419 people at baseline, and n=182 people reported knee pain persistent over both time points. The mean (SD) values were age 61 (9) years, BMI 30.1 (5.8) kg m^{-2}, 59% female, and 36% fulfilled radiographic OA criteria at the index knee, for those with persistent knee pain at 1 year.

In univariate analysis, persistent knee pain was associated with a lower PPT at baseline (461 vs 424 kPa; OR (95% CI) 0.58 (0.34-0.97) p=0.020). Adjustments for age, sex and BMI removed the significance from the association (adjusted OR (95% CI) 0.64 (0.36-1.13) p=0.120).

In those with persistent pain, worse 1 year ICOAP-constant, ICOAP-intermittent, painDETECT and knee pain severity were correlated with lower baseline anterior tibia PPT (r= -0.28 to -0.24; p<0.004). After adjustment for baseline pain, 1 year ICOAP-constant pain scale was significantly predicted by baseline PPT (B (95% CI), -1.05 (-1.91 to -0.20) p=0.016). Linear regression with adjustments for age, sex and BMI also indicated that baseline PPT predicted worse ICOAP-constant pain (B (95% CI)-0.99 (-1.94 to -0.04) p=0.041).

The presence of radiographic OA at baseline was not significantly associated with PPT at baseline. Adjustment for baseline radiographic OA did not remove the association between baseline PPT and

ICOAP-constant at 1 year (anterior tibia PPT -1.04 (-1.89 to -0.18) p=0.018). PPT at joint lines or sternum displayed similar patterns of association with 1 year pain as did PPT at the anterior tibia.

Conclusions

Pressure pain detection thresholds suggestive of central sensitisation at baseline were associated with knee pain prognosis at 1 year, in particular with constant knee pain. The presence of radiographic OA also predicted 1 year pain prognosis, independent of PPT.